

Claims

[c1] An apparatus for classification of a fat to lean interface of a meat cut and trimming the fat therefrom comprising:

a split multi-belt conveyor powered by a conveyor drive and operable for conveying a meat cut, said conveyor having a plurality of proximately spaced conveyor belts extending in parallel and coplanar along a path of conveyance having a plurality of uniform gaps between the plurality of belts;

a probe assembly having a plurality of elongated laterally aligned probes operable to sense a fat to lean interface of the meat cut where each of said probes are aligned along one of the gaps and the probe assembly is selectively driven by a drive to effect elevation and lowering of the probes and effect travel along a circular path for insertion and retraction of the probes and where said probe assembly is operable to output a plurality of signals each characteristic of the fat to lean interface sensed by one of the plurality of probes; and

a meat cut hold down assembly positioned above the multi-belt conveyor and having an endless hold down track powered by a hold down drive and operable to hold

down and convey the meat cut along the path of conveyance during probing.

- [c2] The apparatus for trimming fat as recited in Claim 1 where the probe assembly is operable to tip forward along the path of conveyance to be carried along by the meat being conveyed during penetration.
- [c3] The apparatus for trimming fat as recited in Claim 1 further comprising:
 - a plurality of endless grab chains for grabbing and pulling the meat cut into a blade, said grab chain having a plurality of teeth where each of said grab chains extend along the path of conveyance and each aligned along one of the gaps and powered by the conveyor drive.
- [c4] The apparatus for trimming fat as recited in Claim 1 further comprising:
 - a blade assembly having a blade positioned in one of the gaps along the path of conveyance and operable to position the blade responsive to the lean to fat interface sensed by the probes.
- [c5] The apparatus for trimming as recited in Claim 4 where the blade assembly comprises an articulating blade arm having the blade mounted thereon on a first end of said

arm and having a pivoting point in a central portion of the blade arm, and an actuator operatively attached to an opposing end of said blade arm for selectively effecting pivoting about the pivot point for positioning the blade mounted to the first end.

- [c6] The apparatus for trimming as recited in Claim 5 where the blade is compliantly attached to the first end of the blade arm to allow for at least one range of motion.
- [c7] The apparatus for trimming fat as recited in Claim 1 further comprising:
 - a plurality of blade assemblies each positioned in one of the gaps along the path of conveyance and having a plurality of blades attached thereto where the blade assemblies are operable to controllably position the plurality of blades each to a position responsive to the plurality of signals from the plurality of probes.
- [c8] An apparatus for classification of a fat to lean interface of a meat cut and trimming the fat therefrom comprising:
 - a probe assembly having a plurality of elongated laterally aligned probes operable to sense a fat to lean interface of a meat cut where each of said probes are aligned along one of a plurality of gaps between split conveyor belts and said probe assembly operable to be selectively

driven by a drive to effect elevation and lowering of the probe assembly along a circular path for insertion and retraction of the plurality of probes and where said probe assembly is operable to output a plurality of signals from the plurality of probes each characteristic of the fat to lean interface sensed by one of the plurality of probes.

- [c9] The apparatus for trimming fat as recited in Claim 8 further comprising:
 - a blade assembly having a plurality of blades where the blade assembly is operable to controllably position the plurality of blades each to one of a plurality of positions in response to the plurality of signals from one of the plurality of probes.
- [c10] The apparatus for trimming fat as recited in Claim 8 where the probe assembly is operable to tip forward along the path of conveyance to be carried along by the meat cut during penetration.
- [c11] The apparatus for trimming fat as recited in Claim 8 where the probe assembly has a lifter member attached thereto one end of the probe assembly and the lifter is pivotally attached to a crank member which can be selectively driven to effect the circular motion of the probe assembly.

[c12] An apparatus for classification of a fat to lean interface of a meat cut and trimming the fat therefrom comprising:
a probe assembly having a plurality of elongated laterally aligned probes operable to sense a fat to lean interface of a meat cut where each of said probes are aligned along one of a plurality of gaps between split belts and said probe assembly operable to be selectively driven by a drive to effect elevation and lowering of the probe assembly along a circular path for insertion and retraction of the plurality of probes and where said probe assembly is operable to output a plurality of signals from the plurality of probes each characteristic of the fat to lean interface sensed by one of the plurality of probes; and
a blade assembly having a plurality of blade elements laterally aligned and each blade element aligned along one of the plurality of gaps downstream of the probes along a path of conveyance and said blade assembly operable to control a cutting position of the plurality of blades responsive to the plurality of signals from the probe assembly characteristic of the fat to lean interface for trimming fat from the meat cut.

[c13] The apparatus for trimming fat as recited in Claim 12 where the probe assembly is operable to tip forward along the path of conveyance to be carried along by the

meat cut during penetration.

- [c14] The apparatus for trimming fat as recited in Claim 13 further comprising:
 - a meat cut hold down assembly positioned above the probe assembly and having an endless hold down track powered by a hold down drive and operable to hold down and convey the meat cut along the path of conveyance during probing.
- [c15] A method for classifying a meat cut and trimming the fat therefrom comprising the steps of:
 - conveying a meat cut along a split multi-belt conveyor having a plurality of proximately spaced conveyor belts extending in parallel along a path of conveyance having a plurality of uniform gaps there between;
 - probing the meat cut with a probe assembly having a plurality of elongated laterally aligned probes operable to sense a fat to lean interface of the meat cut where each of said probes are aligned along one of the gaps;
 - selectively driving the probe assembly with a drive effecting elevation and lowering of the probe assembly along a circular path for insertion and retraction of the probes;
 - tipping the probe's tip forward along the path of conveyance with the conveyance of the meat cut during insertion in the meat cut; and

sensing the fat to lean interface with the plurality of probes and outputting a plurality of signals from each probe characteristic of the fat to lean interface.

- [c16] The method for trimming fat as recited in Claim 15 further comprising the steps of:
receiving the plurality of signals from each probe to a controller and controlling with the controller a blade assembly having a blade attached thereto to adjust the position of the blade responsive to the signal.
- [c17] The method for trimming fat as recited in Claim 15 further comprising the steps of:
holding down and conveying the meat cut with a hold down assembly positioned above the multi belt conveyor where said hold down assembly has an endless hold down track powered by a hold down drive.
- [c18] A method for classifying a meat cut and trimming the fat therefrom comprising the steps of:
probing a meat cut with a probe assembly having a plurality of elongated laterally aligned probes operable to sense a fat to lean interface of a meat cut where each of said probes are aligned along one of a plurality of gaps between a plurality of proximately spaced conveyor belts;
selectively driving the probe assembly with a drive ef-

fecting elevation and lowering of the probe assembly along a circular path for insertion and retraction of the probes; sensing the fat to lean interface of the meat cut being conveyed on the conveyor belts along a path of conveyance with the plurality of probes and outputting a plurality of signals from each probe characteristic of the fat to lean interface; and holding down the meat cut with an endless hold down track powered by a drive and operable to hold down and convey the meat cut during probing.

- [c19] The method for trimming fat as recited in Claim 18 further comprising the steps of:
tipping the probe's tip forward along the path of conveyance with the conveyance of the meat cut during insertion in the meat cut.
- [c20] A method for classifying a meat cut and trimming the fat therefrom comprising the steps of:
probing a meat cut with a probe assembly having a plurality of elongated laterally aligned probes operable to sense a fat to lean interface of the meat cut where each of said probes are aligned along one of a plurality of gaps between a plurality of proximately spaced conveyor belts;
selectively driving the probe assembly with a drive ef-

fecting elevation and lowering of the probe assembly along a circular path for insertion and retraction of the probes; sensing the fat to lean interface of the meat cut being conveyed on the conveyor belts with the plurality of probes and outputting a plurality of signals from each probe characteristic of the fat to lean interface; and controlling a blade assembly having a plurality of blade elements laterally aligned and each blade element aligned along one of the plurality of gaps along a path of conveyance downstream the probes, to adjust the cutting position of the plurality of blade elements responsive to the plurality of signals from the probe assembly characteristic of the fat to lean interface for trimming fat from the meat cut.

- [c21] The method for trimming fat as recited in Claim 20 further comprising the steps of:
holding down and conveying the meat cut with a hold down assembly positioned above the multi belt conveyor where said hold down assembly has an endless hold down track powered by a hold down drive.